SIEMENS

MAGNETOM Jazz

Extremity Magnetic Resonance System

DATA

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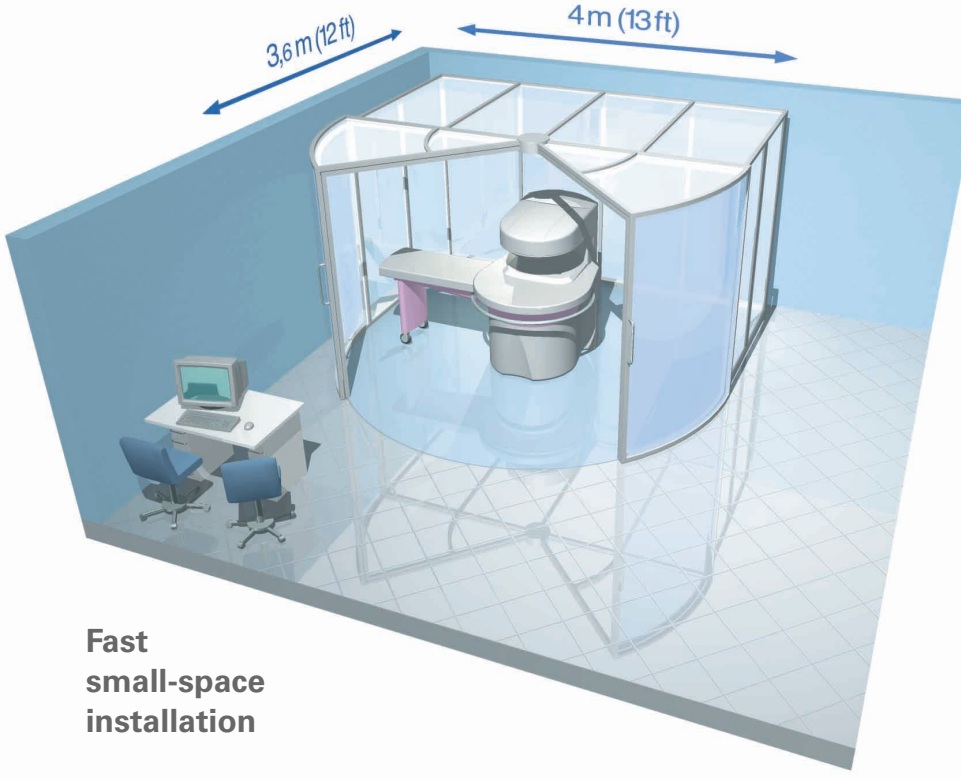
Extremity Magnetic Resonance System

Maximum patient comfort with three-sided open magnet

High-field applications on low-field system

Low life cycle costs due to permanent magnet

Contents



Fast small-space installation

Magnet System

Magnet Design

Operating field strength	0.2 Tesla

C-shaped permanent magnet with vertical magnetic field

Patient Aperture

Vertical gap distance (inner opening)	24 cm (9.44 in.)
Vertical gap distance (outer opening)	30 cm (11.8 in.)

The open design provides free patient access from three sides

Gradient System

Max. gradient field strength	20 mT/m
Min. rise time (0–20 mT/m)	0.8 msec

Gradient Cooling System

Gradient coils	air cooled
Power electronics	air cooled

Passive shielded flat gradient coil system for gradients in x, y, and z direction

Integrated into the magnet pole shoes

Homogeneity

Max. inhomogeneity on a spherical surface

Diameter 14 cm FWHM of proton spectrum	<±4 ppm
Magnetic field drift (10 min.)	<30 Hz
Passive Shim	

Fringe Field

X-axis: horizontal (in front of the magnet)	1.2 m (47.2 in.)
X-axis: horizontal (behind the magnet)	0.95 m (37.4 in.)
Z-axis: horizontal (left/right)	1.2 m (47.2 in.)
Y-axis: vertical	1.1 m (43.3 in.)

Distances of the 0.5 mT line (pacemaker safety limit) from the magnet isocenter

Patient Handling RF System

Patient Table

Swinging table (L×W)	105×63 cm (41.3×24.8 in.)
Table (diameter)	110 cm (43.3 in.)
Table height (fixed)	91 cm (35.8 in.)
Position accuracy	±1 mm
Max. patient weight	200 kg (440 lbs)

Swinging patient table with an adjustable fixation at 6 different positions. Allows a fast and flexible patient positioning.

Patient Positioning Tools

Manual transfer to center of imaging volume

Coils automatically centered in imaging volume

Positioning tools for comfortable and stable positioning of the patient

Head rest

Antimagnetic Step

For easier access of patients with reduced mobility due to orthopedic injury or elderly patients and kids on the patient table

The step has four wheels so it can be easily rolled into place

As soon as weight is placed on the step, the wheels disappear inside the leg of the step

The legs are finished with rubber for a non-slip grip on the floor

Digital Signal Processing System

Operating frequency	8 MHz
Frequency stability (15 min)	$\leq 8\times10^{-8}$

Digital transmit and receive signal processing for fast and flexible modulation and demodulation of the radio frequency signals

- Single sideband modulation with suppressed carrier
- Computer-controlled pulse shape and phase
- Quadrature demodulation
- Highly linear transfer characteristics via software correction

Transmitter Amplifier

Power output	600 W
Bandwidth	2 MHz
Gain stability	0.1 dB

Transmit Coil

Flat linear polarized (LP) transmit coil integrated inside magnet enclosure

Receiver Amplifier

Receiver bandwidth	±350 kHz
Gain	38 dB/113 dB (automatic control)
Noise figure	<1.0 dB

Low Pass Filter

Frequency range (digital filter)	8.0 kHz to 78.0 kHz

Computer System and Console

Host computer

Host CPU	Pentium MMX 200
Main memory (RAM)	32 MByte
Hard disk (raw capacity)	4.3 GByte
Image capacity (256×256)	approx. 20,000

MR Console MRC

Full multi-tasking for simultaneous functionality, e.g.:

- Patient registration
- Scanning
- Post-processing
- Archiving
- Filming

Magneto-Optical Disk Drive

Cartridge capacity	640 KByte
Image capacity (matrix 256×256)	approx. 4,500

3 1/2" for MOD (re-writable) media

DSP Board

2 DSP Boards for measurement control and image reconstruction

Dynamic memory (RAM)	65 MByte
Image reconstruction time (matrix 256×256)	<150 ms

Color Monitor

High-resolution flicker-free color monitor

Screen size	43 cm (17“)
Screen matrix	1280×1024
Video standard	525 lines/60 Hz, non-interlaced Multisync
Image display matrix	
Full screen	510×478
Four segments	254×238
Number of grey levels	256

Coil Kit

Special receiving coils for optimized signal-to-noise ratio and high-resolution imaging.

All coils are passively decoupled and automatically tuned.

Automatic coil detection.

Coil	Features	Applications
Dual-Phased-Array Knee Coil 	• Array coil with 2 integrated preamplifiers • Open patient-friendly design	• Examinations of the knee, thigh, calf and arm
Dual-Phased-Array Ankle Coil 	• Array coil with 2 integrated preamplifiers • Open patient-friendly design	• Examinations of the foot, ankle, elbow and forearm
Dual-Phased-Array Wrist Coil 	• Array coil with 2 integrated preamplifiers • Open patient-friendly design	• Examinations of the hand, wrist and elbow

Coil	Features	Applications
Regular Shoulder Coil 	• Solenoid coil • Anatomically shaped • Open patient-friendly design	• Shoulder examinations
Large Shoulder Coil 	• Solenoid coil • Anatomically shaped • Open patient-friendly design	• Examinations of the shoulder and large knees
Hip Coil	• WIP	• Hip examinations

Coil Storage Cart

Specially designed non-ferromagnetic cart for easy storage of the coils and accessories. May be rolled to convenient locations in the pavilion.

Coil storage cart (L×W×H)	91×55×124 cm (35.8×21.7×48.8 in.)

Dedicated storage locations:

- DPA Knee coil
- DPA Ankle coil
- DPA Wrist coil
- Regular Shoulder coil
- Large Shoulder Coil
- Knee support
- Head rest
- Positioning tools

Furnished with a lockable shutter

Scanning

Clinical Imaging

Full range of protocols optimized for a wide range of clinical applications for all extremities.

- Spin Echo (Single and Double Echo)
- Inversion Recovery
- Short Time Inversion Recovery (STIR)
- Gradient Echo (2D and 3D)
- Turbo Spin Echo (TurboSE)

User-Defined Protocols

The sequence parameters of the protocols may be modified according to individual needs

The user can define individual protocols and store them in a user-specific menu

Scan Preparation

Frequency, transmitter power and receiver gain are adjusted automatically (in-line adjustment).

Scout

Time saving, start of scout scan within the patient register window. Several orthogonal images with a short acquisition time will be acquired.

Slice Positioning

Automatic slice positioning with interactive graphical interface based on multiple localizer images,

Paging possible through reference images during graphical positioning

- Multi-slice imaging with variable parameters
- Multiple slices and angles
- Previous positioning can be recalled (History function)

Measurement Queue

Allows queuing of multiple protocols during an examination for streamlined operation. Pending Queued protocols which are not yet started may be modified and removed from queue.

Image Processing

Image Recall

Images are stored in a series-oriented order allowing fast image access and recall. Each single measurement correlates to one series.

Image preview within image select window

Automatic image display after image reconstruction

Image Display

The image display screen can be organized in various subdivisions

Different series or patients can be displayed simultaneously

Configurable Mother and Child Image

Window setting with mouse

Text manipulation and image annotation

Image Evaluation Sequence Performance

Post-Processing

Sorting of images

Area and distance determination

Intensities and profiles

Image scrolling

Image rotation and mirroring

Histograms

Image magnification and roaming (shifting of magnified area)

Statistical evaluation of ROI's

Labeling of images with graphics or text

Image Filter

For noise reduction in the MR images. Uses high-pass and low-pass filtering and automatically adjusts to the local image content (adaptive filtering).

Spin Echo

Echo time TE	min. 12 ms
Repetition time TR	min. 50 ms

Inversion Recovery (IR)

Inversion time TI	min. 200 ms
Echo time TE	min. 18 ms
Repetition time TR	min. 260 ms

Short Time Inversion Recovery (STIR)

Inversion time TI	min. 50 ms
Echo time TE	min. 18 ms
Repetition time TR	min. 100 ms

Turbo Spin Echo

Echo time TE	min. 80 ms
Repetition time TR	min. 200 ms

Gradient Echo

Echo time TE	min. 8 ms
Repetition time TR	min. 24 ms

- TR,TE and TI (in steps of 10/2/5 ms)
- Flip angle (in steps of 5°)

Gradient Echo-STIR (GE-STIR)

Gradient echo sequence with an additional inversion-pulse which allows the suppression of bright signal from fatty tissue e.g. bone marrow

DESS (Double Echo in Steady State)

Gradient echo sequence for better visualization of cartilage lesions. Gives you a high contrast between cartilage and synovial fluid.

Acquisition Parameters

General Acquisition Parameters

Reduced number of Fourier lines

Selectable from n/2×n to n×n

Also combined with rectangular FoV

Averaging

Number of data acquisitions 1/2, 1, 2, 3, 4,...32

1/2 acquisition corresponds to Half Fourier Imaging

Rectangular field of view

Half-Fourier-Imaging. Reduction of acquisition time by approx. 50 % without loss of spatial resolution

Parameters for 2-D Acquisitions

Acquisition matrix

Square matrices	256×256

Spatial resolution

Highest in-plane resolution	0.4 mm
Field of view	100–300 mm

Slices

Slice thickness	2–10 mm (in steps of 0.5 mm)
Number of slices	max. 96
Slice gap	selectable
Slice orientation	transverse, sagittal, coronal, oblique, double oblique (in steps of 1°)
Slice order	interleaved

Parameters for 3-D Acquisitions

Acquisition volume

Square matrices	256×256
Number of 3-D partitions	8...128

Spatial resolution

Field of view	100–300 mm
Thickness of excited 3-D volume	40–200 mm
Max. number of slabs (3-D volumes)	1
Slice thickness (partition)	min. 0.6 mm

Documentation and Networking

Digital Camera Interface

Interface for connection of a laser imager

The Numaris Ortho software supports a wide range of manual filming features

Image matrix size	480×512×8 bit
Digital output	8 bit parallel

Cameras to be connected

Dupont	LP 400
Agfa	Matrix Compact L LR 3300
Kodak	1120
3M	P831R M952 M959 XL Dry View 8300 Dry View 8700
Fuji	FM-DP L, IM 3543
Konica	LI-10A, LI-10

Analog Camera Interface

Image matrix size	510×478×6 bit
Output	RS 170 composed

DICOM 3.0 and Pacsnet

Network interface for fast and reliable image transfer of MR images. Includes DICOM Send

Local Network	Ethernet
Data transfer rate	max. 10 MBit/s
Transfer time (256×256 image)	approx. 4 s

Remote Diagnostics

Direct computer link between the MR system and the local Siemens service department, or the Siemens service centers (via telephone modem)

- Image transfer for further evaluation
- Reading of entries in the error logbook
- Remote trouble shooting
- Remote access to Service Site Data Base
- Start of preventive maintenance and quality assurance routines

Remote diagnostics is provided in conjunction with a service contract with Siemens (*UPTIME* Services)

Installation

Power Requirements

Line voltage	100, 110, 220, 230, 240 V
Stability tolerances	±10%
Line frequency	50/60 Hz, ±2 Hz
Power requirement	1.1 kVA 0.8 kVA (during normal operation) 0,2 kVA (stand-by)

Radio Frequency Shielding

For shielding of the examination room from external RF sources a special "Modular Shielding Pavilion" is used

Light and air can freely pass through the attractive MSP which is tailored to the system design, so no additionally lighting, air-conditioning as well as an intercom system is required

RF attenuation factor	>70 dB
Frequency Range	7–9 MHz

Space Requirements

Min. total space requirement	18 m^2 (194 sq.ft.)

Dimensions

	Width [cm]	Depth [cm]	Height [cm]	Weight [kg]	Heat Dissipation[1] [W]
Examination Room					
Magnet (incl. covers)	125 (49.2 in.)	150 (59.1 in.)	156 (61.4 in.)	1930 (4263 lbs)	350
Patient table	63 (24.8 in.)	105 (41.3 in.)	91[2] (35.8 in.)	110 (243 lbs)	
Required min. room height			240 (88.6 in.)		
Control Room					
MRC Console (incl. monitor)	84 (33.1 in.)	94 (37 in.)	81 (31.9 in)	150 (331 lbs)	350

1 Heat dissipation into air
2 Above floor level

As is generally true for technical specifications, the data contained herein varies within defined tolerances.

Siemens reserves the right to modify the design and specifications contained herein without prior notice. Please contact your local Siemens representative for the most current information.

This product bears a CE marking in accordance with the provisions of directive 93/42/EEC of June 14th, 1993 for medical products

CE 0051

CAPE design

Siemens **medical Solutions** that help

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